ABSTRACT SUBMISSION TO SPIE OPTICS + PHOTONICS 2011

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Session:

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Presentation Type: Oral Presentation

ABSTRACT TITLE: MODIS Cloud Optical Property Retrieval Uncertainties Derived from Pixel-Level VNIR/SWIR Radiometric Uncertainties

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Short Bio: Dr. Steven Platnick is responsible for the MODIS Level-2 cloud optical properties product as well as Level-3 gridded aggregations of all atmospheric products. He is also the MODIS Atmosphere Team Leader and the Earth Observing System Senior Project Scientist. He is a member of the Earth Sciences Division at the NASA Goddard Space Flight Center.

ABSTRACT

Moderate Resolution Imaging Spectroradiometer (MODIS) retrievals of optical thickness and effective particle radius for liquid water and ice phase clouds employ a well-known VNIR/SWIR solar reflectance technique. For this type of algorithm, we evaluate the quantitative uncertainty in simultaneous retrievals of these two cloud parameters to pixel-level radiometric calibration estimates and other fundamental (and tractable) error sources.

The technique, first implemented in MOD06 Collection 5 processing, uses sensitivity calculations derived from pre-computed cloud reflectance look-up tables coupled with estimates for the effect of various error sources on cloud-top reflectance. An important error source is instrument radiometric calibration (other tractable sources included in Collection 5 are surface spectral albedo and atmospheric corrections). We will show cloud retrieval uncertainties derived from new MODIS L1B VNIR and SWIR band pixel-level uncertainty estimates that will be used in Collection 6 processing. Because of the nature of the approach, results will deal exclusively with pixel-level uncertainties associated with plane-parallel clouds; real-world radiative departures from a plane-parallel model are an additional consideration. While we demonstrate the uncertainty technique with operational 1 km MODIS retrievals from the Terra and Aqua satellite platforms, the technique is applicable to any reflectance-based satellite or air-borne sensor retrieval using similar spectral channels.